Relation of Occupational Change to Cardiovascular Risk Factor Levels in Rural Chinese Men: The People's Republic of China–United States Collaborative Study on Cardiovascular and Cardiopulmonary Epidemiology

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During the second half of the 20th century, millions of people in developing countries ceased to be farmers and sought other occupations. Little has been reported of the impact of this transition on risk factors for cardiovascular disease (CVD) and other chronic diseases. Ecological and prospective studies indicate that elevated blood pressure, elevated total cholesterol (TC), obesity, and smoking are major risk factors for stroke and coronary heart disease (CHD) in Chinese populations.[1–4] Concurrent with economic development in China, levels of risk factors have tended to rise.[5] This study examined men residing in rural areas near big cities who worked as farmers in 1983–1984 and the relation of occupational change from 1983–1984 to 1993–1994 and their CVD risk factor changes.

METHODS

The People's Republic of China–United States Collaborative Study on Cardiovascular and Cardiopulmonary Epidemiology[6] sampled men aged 35 to 54 years from rural areas of Beijing in northern China and Guangzhou in southern China in 1983–1984, 1987–1988, and 1993–1994.

Blood pressure (systolic [SBP] and diastolic [DBP]), body mass index (BMI), fasting serum total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), and triglycerides (TG) were measured by internationally standardized methods.[6] The 1993–1994 survey tracked change of occupation among the men over the past 10 years (1983–1993). Associations of occupation and occupation change with CVD risk factors and changes were analyzed by comparison of cohorts with complete data using regression models. Our hypothesis was that CVD risk factor trends would be more adverse for farmers who left agricultural work than for farmers who remained field workers.

RESULTS

Of 428 rural men aged 35 to 54 years who worked as field laborers in 1983–1984, 102 changed occupation by 1993–1994 and were no longer working in farming. None of the 70 men engaged in sedentary office work or the 135 rural factory workers changed occupation.

Baseline levels of 6 risk factors (SBP, DBP, BMI, TC, TG, HDL-C) were lower in farmers than in office workers and rural factory workers (Table 1). In 1983–1984, the 102 farmers who changed occupation over the next decade had SBP, DBP, and BMI levels similar to those of the 326 farmers who did not change occupation. Baseline lipid levels of the 102 farmers were slightly more adverse than those of the 326 who remained farmers. The 102 farmers who changed occupation experienced more adverse trends compared with the 326 who remained farmers. The greater increases in SBP, DBP, and BMI of the 102 farmers who changed occupation compared with those who did not were statistically significant; the greater increase in TG and lesser increase in HDL-C were not significant. TC increases were similar.

As a result of these trends, 1993–1994 average SBP, DBP, BMI, TC, and TG values were higher and HDL-C values were lower for the 102 farmers who changed occupations than for the 326 farmers who remained farmers. By 1993–1994, the farmers who changed occupation had risk factor levels sim-

TABLE 1— Center-Adjusted Mean and Standard Error or Percentage of Risk Factors, by Occupation and Occupational Change Groups: Rural Men in Beijing and Guangzhou, China, 1983–1984 and 1993–1994[a]

Occupation and Occupational Change Group	Date of Screening	SBP (mm Hg), Mean (SE)	DBP (mm Hg), Mean (SE)	BMI (kg/m^2), Mean (SE)	TC (mg/dL), Mean (SE)	TG (mg/dL), Mean (SE)	HDL-C (mg/dL), Mean (SE)	Smoking, %
Field work (n = 428)	1983–1984	117.7 (0.8)	74.9 (0.5)	20.5 (0.1)	161.2 (1.7)	88.6 (3.3)	51.0 (0.7)	92.9
Field work to field work (n = 326)	1983–1984	117.9 (1.0)	75.1 (0.6)	20.6 (0.1)	159.3 (2.1)	85.8 (4.0)	51.7 (0.8)	99.9
	1993–1994	129.7 (1.4)	81.2 (0.8)	21.5 (0.2)	173.9 (2.2)	91.6 (5.7)	54.3 (0.9)	88.4
	Change	11.8 (1.1)	6.1 (0.7)	1.0 (0.1)	14.7 (2.0)	5.7 (5.8)	2.6 (0.9)	(11.5)
Field work to other work (n = 102)	1983–1984	117.3 (1.6)	74.3 (1.0)	20.2 (0.2)	165.9 (3.5)	95.6 (6.6)	49.3 (1.3)	91.2
	1993–1994	135.4 (2.3)	85.1 (1.3)	21.8 (0.3)	180.0 (3.7)	118.8 (9.5)	50.0 (1.5)	89.1
	Change	18.0* (1.9)	10.7* (1.2)	1.6* (0.2)	14.1 (3.3)	23.1 (9.6)	0.7 (1.4)	(2.1)*
Factory work to factory work (n = 135)	1983–1984	119.4 (1.5)	76.8 (1.0)	20.8 (0.2)	167.7 (3.2)	93.8 (6.0)	51.2 (1.2)	90.4
	1993–1994	131.9 (2.1)	83.6 (1.2)	21.8 (0.3)	186.4 (3.4)	118.7 (8.7)	53.7 (1.3)	81.6
	Change	12.5 (1.7)	6.8 (1.1)	1.0 (0.2)	18.7 (3.0)	24.9 (8.8)	2.5 (1.3)	(8.8)
Sedentary office work to sedentary office work (n = 70)	1983–1984	123.1 (1.9)	78.5 (1.2)	21.6 (0.3)	178.4 (4.2)	108.8 (7.9)	55.2 (1.6)	89.6
	1993–1994	137.5 (2.7)	87.5 (1.5)	23.7 (0.3)	192.2 (4.4)	153.2 (11.3)	51.5 (1.8)	85.4
	Change	14.5 (2.2)	9.0 (1.4)	2.1 (0.2)	13.8 (3.9)	44.4 (11.5)	(3.7) (1.7)	(4.2)

Note. SBP = systolic blood pressure; SE = standard error; DBP = diastolic blood pressure; BMI = body mass index; TC = total cholesterol; TG = triglycerides; HDL-C = high-density lipoprotein cholesterol.
[a]Participants were aged 35 to 54 years at baseline. Participants had data on all variables.
*P < .05 for comparison of occupational change groups of field workers at baseline, i.e. those who changed occupation (n = 102) vs those who remained field workers (n = 326).

ilar to those of office workers and factory workers. In contrast, the farmers who remained farmers had more favorable risk factor levels.

DISCUSSION

At baseline, rural men working in agricultural occupations had lower risk factor levels than did sedentary office workers and rural factory workers. In all 3 occupations, CVD risk increased over the 10-year period encompassed by the surveys. Farmers who changed occupation experienced more adverse risk factor changes than did farmers who remained in agricultural work. This occupation change and its association with changes in risk factors may reflect and presage overall trends that accompany China's urbanization. Similar associations have been found in other developing countries.[7–10] Change of occupation from farming to other work decreased intensity of physical labor and increased job strain. Along with adoption of a policy by the Chinese government that opened the lines of communication between economic, technical, and scientific activities in China and other countries and economic reform, nationwide reports have shown increases in CVD risk factors in China between 1980 and 1990. Hypertension prevalence increased by 25%,[11] diabetes increased by 200% to 300%,[12] and obesity increased by 53% for urban and 40% for rural populations.[13] The present study indicates that change of occupation is 1 underlying reason for these trends.

Worsening risk factors with economic improvement contrasts with patterns in Western countries in the past 40 years, where an inverse relation of socioeconomic status (SES) with CVD and its risk factors has been found.[14–15] Studies conducted in the 1930s and 1940s in the United States and the United Kingdom reported higher CVD rates among men in higher SES groups. Between the 1940s and the 1960s, this trend reversed.[16]

The observed association between occupation change and CVD risk factors in Chinese rural men may presage a rise in CVD in conjunction with increased affluence in China. This increase of CVD risk factor levels among farmers and changes of occupation from rual field work to other types of work should alert developing countries to the impact of unprecedented modern socioeconomic transition on health risks. Public health education and promotion of healthy lifestyles are urgently needed as economic improvement enable people to move from 1 social class to another. ■

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